

PERELOV, N. A., PROKOPIYEVA, E. I., NOVIKOVA, N. R., LOZHKIN, O. V., DAROVSKIKH, V. F.,
and DENSIENKO, G. F. (Institut du Radium, Leningrad, USSR)

"Sur Les Principes de Preparation d'emulsions a Grains Tres Fins Pour Les
Recherches Nucleaires et Leurs Proprietes."

paper presented at Program of the Second International Colloquium on Corpuscular
Photography. Montreal, 21 Aug - 7 Sep 1958.

Encl: B-3, 114, 647

CHICOM/28-3-5-4/20

21 (0)

AUTHOR: N. A. Perfilov, N. P. Novikova, E. I. Prokofeva

TITLE: Extremely Fine-Grained Nuclear Emulsion

PERIODICAL: Yuan Tzu Neng, 1958, Vol 3, Nr 5, pp 438-443

ABSTRACT: The authors discovered a method for manufacturing extremely fine-grained nuclear emulsion. A method of potential control reportedly can provide good reproducibility. The most probable size of the grains were 0.04-0.08 μ . The principle and process are described. Three different types of emulsion are presented and illustrated by microphotographs and figures. The first type is a low-sensitivity "H-9 fragment" emulsion, that can be used to detect particles with specific ionization losses, such as highly charged fragments, α -particles with energies from 20-30 Mev. and 5-7 Mev. protons. The second type is "H-9 sensitive" emulsion which can be used to detect protons with energies of approximately 50 Mev. The third type is the "HP relativistic" emulsion, that can detect minimum ionization charged particles. The authors also reported that the first type emulsion film will not change in characteristics after a year storage period. The second type

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Extremely Fine-Grained Nuclear Emulsion (Cont.)

CHICOM/28-3-5-4/20

does not change in a period of 6-8 months. The storage properties of the third type has not been investigated in detail. There are 10 figures, 1 table and 6 non-Chicom references.

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Card 2/2

Perfilov, N. A.

AUTHORS. Perfilov, N. A., Movikova, N. R., Prokof'yeva, Ye. I. 89-15/29

TITLE: A Particular Fine Emulsion for Nuclear Investigations (Osobo melko zernistyye emul'sii dlya yadernykh issledovaniy).

PERIODICAL: Atomnaya Energiya, 1958, Vol. 4, Nr 1, pp. 45 - 51 (USSR).

ABSTRACT: A production method for nuclear photoemulsions is described, in which the measurements of the microcrystals are 0.04 - 0.08 μ and which are very uniformly distributed in the entire layer. In order to warrant reproducibility in production, a method of "potentiometer control" is given. By this method it is possible with great accuracy to attain the aim that, in the mixing of the components of the photoemulsion, the ratio between bromine- and silver ions always remains constant. The time of emulsion fixation is determined by the quantity to be produced. For 100 ml liquid emulsion it is ~ 18 m. According to the registration sensitivity with respect to charged particles the photoemulsions produced can be divided into 3 groups which differ only as to small additions and the manner of sensibilization.

Type I. Emulsion "P - 9 for Fission Products", with this emulsion highly ionized ions of fission fragments, 20 - 30 MeV-particles, and 5 - 7 MeV protons can be recorded.

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Card 2/2

APPROVED FOR RELEASE

SOV/89-5-2-12/36

AUTHORS: Perfilov, N. A., Solov'yeva, Z. I.

TITLE: On a Complex Nuclear Fission of Uranium Under the Influence of Neutrons of an Energy of 14 MeV (O slozhnom delenii yader urana pod deystviyem neytronov s energiyey 14 Mev)

PERIODICAL: Atomnaya energiya, 1958, Vol. 5, Nr 2, pp. 175-176 (USSR)

ABSTRACT: In various papers (Refs 1-3) (with thick photoemulsions as well as with ionization chambers) the occurrence of a far-reaching α -particle was observed when the uranium nucleus undergoes fission. This α -particle is formed during the moment of fission. The angle between the direction of flight of this α -particle and the light fission fragments is about 80° . A maximum was observed within the domain of 16-17 MeV in the energy distribution of the α -particles. By means of nuclear photoplates saturated with uranium salt (exposed to a neutron beam of 14 MeV-neutrons) fission of the uranium was investigated with the emission of a far-reaching α -particle. Eight cases of a fission with emission of a far-reaching α -particle were found among 10 000 normal fission processes. From these and earlier measurements the conclusion may be drawn that under the influence of fast neutrons fission of the uranium

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On a Complex Nuclear Fission of Uranium Under the
Influence of Neutrons of an Energy of 14 MeV

SOV/89-5-2-12/36

nucleus with 3 fission fragments corresponds to about 1 000 to
1 300 cases of normal fission. This process, therefore, is about
3 to 4 times less probable than in the case of fission of U^{235}
by thermal neutrons. There are 2 figures and 4 references, 1 of
which is Soviet.

SUBMITTED: February 10, 1958

Card 2/2

PERFILOV, N. A.
(Card 2)

30-1-1, 39

AUTHOR: Vinogradov, A. P., Academician

TITLE: The Conference Concerning the Utilization of Radioactive Isotopes in Scientific Research (Na konferentsii po ispol'zovaniyu radioizotopov v nauchnykh issledovaniyakh)

PERIODICAL: Vestnik AN SSSR, 1958, Vol. 28, Nr 1, pp. 71-78 (USSR)

ABSTRACT: This conference took place from September 9, to September 20, 1957 in Paris and had been convened by the UNESCO. It was attended by 1500 scientists from 50 countries. The head of the Soviet delegation was A. V. Topchiyev; the Soviet delegation submitted 40 reports, which are dealt with. All other reports were from Western countries. The conference program was divided into two sections: A physical and a biological section. In the physical section, to which also the author belonged, discussions were held on physics, chemistry, metallurgy, geophysics, etc. The greatest attention was paid at this conference to the reports concerning the obtaining of radioactive isotopes, the production of radioactive sources, measuring technique and methods. V. L. Karpov, on behalf of the collective of the scientific Physical-Chemical Research Institute imeni L.

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The Conference Concerning the Utilization of Radioactive
Isotopes in Scientific Research

30-1-12/30

Ya. Karpov (Kollektiv nauchno-issledovatel'skogo fiziko-khimicheskogo instituta imeni L. Ya. Karpova) reported on the establishment of a γ -ray source of high efficiency. K. K. Aglintsev discussed basic problems of measuring dosage. N. A. Perfilov and his collaborators reported on the production of a finelygrained emulsion for nuclear research. P. L. Gruzin, I. M. Frantsevich, A. A. Zhukhovitskiy, V. T. Borisov, S. Z. Bokshetyn and others submitted data concerning the diffusion and electric transmission of carbon in iron and its alloys. A. M. Moris reported on the diffusion kinetics with respect to the melts of salts, oxides, and sulphides. The method of autoradiography for the determination of non-metallic inclusions in iron alloys was dealt with by V. M. Gerasimov and for the purpose of investigating wear in contact with the structure of alloys, iron-, chromium-, and tungsten-carbides - L. S. Palatnik. V. I. Spitsyn gave information concerning the structure of heteropoly compounds, especially of phosphorus wolfrates, and pointed out the great mobility of oxygen- and hydrogen atoms in them. Ye. Finkel' reported on the original and very simple method

Card ^{2/2}
2/3

21(7)

AUTHORS:

Perfilov, N. A., Denisenko, G. F.

SCV, 86-35-1-10 11

TITLE:

On Triple Disintegrations of Uranium Nuclei (O trekhkhranrasshchepleniyyakh yader urana)

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1988, Vol. 35, Nr 3, PP 631 - 634 (USSR)

ABSTRACT:

The present paper reports on investigations of disintegrations of uranium nuclei into three multi-charged particles by 460 and 660 MeV protons. Disintegrations can be divided into 2 types. Type I: Two of the 3 multi-charged particles have the same ranges; from the equality of the ranges it follows that the two particle masses must be nearly equal. Type II: One of the two multi-charged particles has a considerably larger range in the photolayer, and therefore a considerably smaller mass than the other two. The yield of the triple disintegrations of type II surpasses type I by 5 to 6 times its amount. The present paper deals with disintegrations of type II. The following

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On Triple Disintegrations of Uranium Nuclei

SOV/1-11-1977

important experimental results are published: 1, The yield of the triple disintegrations grows with increasing energy of the incident proton; thus, in the case of a variation of proton energy from $E_p = 460$ MeV to $E_p = 660$ MeV the yield is doubled. 2,

A light multi-charged particle of a triple disintegration prefers the forward direction relative to the incident beam of protons (forward-backward ratio ≈ 5). 3, The charge of the light multi-charged particle was photo-metrically determined (Ref. 1) in the case of 22 disintegrations. Results

charge of the particle	4	5	6	7	8	9	10	11
number of particles	1	1	1	1	1	1	1	1
Average charge \sim	6.4							

The energy values determined according to the range-energy curve (Refs 2,3) of the light multi-charged particles are given in a table. For the charge of the rest of the nucleus it holds that $Z = Z_{\text{target}} - (Z_l + \Delta Z)$, where Z_{target} denotes the charge of the uranium nucleus, Z_l the charge of the light multi-charged particle, and ΔZ the modification of the charge

Card 2/3

On Triple Disinfection of Urinary Nuclei

S. V. ...

... by ... disinfection. The ...
... of ... disinfection ...

ASSOCIATION: R. N. ... (R. N. ...
of the Academy of Sciences, USSR)

SUBMITTED: April 12, 1956

Card 3/3

Р. С. Ц. Л. О. В. Н. А.
Р. 2

PHASE I BOOK EXPLOITATION

SOV/3503

Академија наук СССР. Радијевый институт

Trudy, t. IX (Transactions of the Radium Institute, Academy of Sciences USSR,
Vol. 9) Moscow, Izd-vo AN SSSR, 1959. 287 p. Errata slip inserted.
1,700 copies printed.

Ed.: N.A. Perfilov, Doctor of Physical and Mathematical Sciences; Ed. of Publishing
House: G.M. Aron; Tech. Ed.: A.V. Smirnova.

PURPOSE: The volume is intended for physicists.

COVERAGE: The book represents volume 9 of the Transactions of the Radium Institute
and contains the results of studies conducted at the Institute chiefly from
1955 to 1956. There are a number of articles dealing with the study of nuclear
reactions occurring with particles of different energies ranging from several
eV up to hundreds of MeV. Others treat different problems of the physics of
neutrons. Results of studies of various neutron sources, neutron energy distri-
bution in a moderator (water), and other problems connected with the theory of
neutron interaction with matter are presented. The majority of the articles

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2

PERFILOV, N.A.; SOLOV'YEVA, Z.I.

Special cases of the fission of uranium nuclei induced by slow
neutrons. Trudy Radiev. inst. AN SSSR 9:5-40 '59. (MIRA 14:6)
(Uranium) (Nuclear fission)

PERFILOV, N.A.; PROKOF'YEVA, Ye.I.; NOVIKOVA, N.R.

Increasing the sensitivity of an extra-fine-grained emulsion by the
use of the double sensitization method. Trudy Radiev.inst.AN SSSR
9:268-270 '59. (MIRA 14:6)

(Photographic emulsions)

23(3,5)
AUTHORS:

Zakharov, V.I., and Perfilov, N.A.

SOV/77-4-4-12/19

TITLE:

Letter to the Editor; On the Question of the Dependency Between the Electron Sensitivity of Nuclear Photographic Emulsions and the Dimensions of AgBr-Grains

PERIODICAL:

Zhurnal nauchnoy i prikladnoy fotografii i kinematografii, 1959, Vol 4, Nr 4, pp 300-301 (USSR)

ABSTRACT:

The authors present a small study on the quotient ϕ , which is determined by the equation $\phi = \frac{S}{cd}$, S is the elec-

tron sensitivity of nuclear emulsion, c is the AgHal concentration by weight and d is the average diameter of the grain [Ref 1]. The authors investigated the quotient for smaller dimensions of micro-crystals of AgBr ($d=0.03$). The conditions for the experiment were: grains of different dimensions were put out of the emulsion P-9 by centrifuge. The photographic layer was exposed by electrons with an energy of KeV. The electrons were radiated from the radioactive isotopes

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Letter to the Editor; On the Question of the Dependency Between
the Electron Sensitivity of Nuclear Photographic Emulsions and the
Dimensions of AgBr-Grains

Tl²⁰⁴₈₁ with the help of a magnetic spectrometer. The
graphs in figure 1 show the results of the experiment.
There are 2 graphs and 5 references, 3 of which are
Soviet, 1 English and 1 German.

ASSOCIATION: Radiyevyy institut imeni V.G. Khlopina Akademii nauk
SSSR (Radium Institute imeni V.G. Khlopin of the
Academy of Sciences of the USSR)

SUBMITTED: February 12, 1959

Card 2/2

AUTHORS: Ostroumov, V. I., Perfilov, N. A.,
Filov, R. A.

SOV/56-36-2-4/63

TITLE: Cascade α -Particles in Nuclear Fission Caused by
Protons With Energies of 360 and 660 Mev (Kaskadnyye
 α -chastitsy v yadernykh rasshchepleniyyakh, proizvodimykh
protonami s energiyey 360 i 660 MeV)

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959,
Vol 36, Nr 2, pp 367-375 (USSR)

ABSTRACT: In their introduction, the authors discuss the results obtained
by several publications dealing with this subject (Refs 1-6).
In the present paper investigations of stars containing tracks
of α -particles with energies above 30 Mev are described.
The investigations were carried out on photo-plates with a
fine-grained nuclear emulsion P-9 sensitive to protons with
30-40 Mev. The plates were subjected to the action of a 360
and 660 Mev proton beam of the Ob'yedinennyy institut yadernykh
issledovaniy (United Institute for Nuclear Research). Among the
plates with stars containing α -tracks ($E_{\alpha} > 30$ Mev) only such
were chosen for analysis in which the entire α -particle track

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Cascade α -Particles in Nuclear Fission
Caused by Protons With Energies of 360 and 660 Mev

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was located in the photolayer and in which the track formed an angle of $<7^\circ$ with the emulsion plane. The star production cross sections for 360 Mev protons used were taken from the paper by Bernardini et al. (Ref 9), and those for 660 Mev protons from that by Grigor'yev and Solov'yeva (Ref 10). The plates investigated were divided into 3 groups: The first comprised all stars with tracks of a recoil nucleus; they are assumed to be the result of a disintegration of a heavy emulsion nucleus (here called T-stars). The second group comprises such as have no visible tracks of a recoil nucleus (charge carried away $<8e$, $E_\alpha < 8$ Mev or $E_p < 4$ Mev) - disintegration of light nuclei, L-stars. Such stars are classed among the third group as cannot be classed either among the first or the second.

The following was found:

				σ_T [mb]	σ_L [mb]
$E_p = 360$ Mev:	668 stars,	397 (T),	68 (L),	203 (T+L)	85 ± 15 17 ± 6
$E_p = 660$ Mev:	600 "	363 (T),	77 (L),	160 (T+L)	120 ± 25 18 ± 6

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Cascade α -Particles in Nuclear Fission
Caused by Protons With Energies of 360 and 660 Mev

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The attempt is now made, by employing various methods, to estimate the share x of the L-stars in the third group:
1) according to the angular distribution of the fast α -particles, 2) according to the radiation distribution of the stars, 3) according to α/p , the ratio between the number of double-charge particles and that of single-charge particles in L- and T-stars, and 4) from a comparison between the results obtained with 660 Mev protons with those obtained by Serebrennikov (Ref 12) with C, O, and N-disintegrations. The results of this estimation is shown by table 2. The results obtained by the investigation of the angular distribution of α -particles with $E_\alpha > 30$ Mev is shown by figures 1a and 1b (660 Mev protons, 360 Mev protons) for T-stars, and figure 2 shows the same for L-stars. Radiation distribution is shown by figure 3 (T) and figure 4 (L). Further, the relative probability for α -emission from light and heavy emulsion nuclei is investigated, as also the emission probability of nuclear fragments. Results are shown by diagrams (Figs 5a,b (T) and Figs 6a,b (L)). The emission of cascade α -particles and

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Cascade α -Particles in Nuclear Fission
Caused by Protons With Energies of 360 and 660 Mev

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fragments as a result of bombardment with protons of the same energies were found to be quite similar. This seems to indicate that the α -particles are produced by the same type of mechanism. The authors thank O. V. Lozhkin and Yu. I. Serebrennikov for their help and discussions. There are 6 figures, 3 tables, and 14 references, 9 of which are Soviet.

ASSOCIATION: Radiyevyy institut Akademii nauk SSSR
(Radium Institute of the Academy of Sciences, USSR)

SUBMITTED: June 28, 1958

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SOV/56-36-3-2,71

21(7)

AUTHORS:

Darovskikh, V. F., Perfilov, N. A.

TITLE:

The Peculiar Features of Bi Nuclear Fission at Very High
Excitation Energies (Osobennosti deleniya yader Bi pri oboen-
bol'shikh energiyakh vozbuzhdeniya)

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1959.
Vol 36, Nr 3, pp 652-657 (USSR)

ABSTRACT:

In the introduction, the authors discuss a number of papers
dealing with the mass- and charge distribution of fission
products. In the present paper the authors report on investi-
gations of fission processes on Bi nuclei carried out by
means of nuclear emulsions of the type P-9, which had been
treated with a bismuth salt solution. These solutions were
subjected to the action of 660 Mev protons on the synchro-
cyclotron of the OIYaI (Ob'yedinennyy institut yadernykh iss-
ledovaniy - **Joint** Institute of Nuclear Research). The plates
were microscopically evaluated. Investigations were carried
out for the purpose of determining the relative yields for
Bi-fission and also their dependence on the ratio of ranges
of light and heavy fission fragments l_l/l_h for various nuclear

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The Peculiar Features of Bi-Nuclear Fission at Very High Excitation Energies

groups involving different excitation energies. Figure 1 shows six characteristic diagrams (fission yield $n : l_1/l_h$) for 0, 1, 2, 3, 4, 5, 6 and more charged particles, the mean error amounting to $\Delta(l_1/l_h) = 0.1 l_1/l_h$. Figure 2 shows the connection between the average total range of the fission fragments $\bar{l} = l_1 + l_h$ of l_1/l_h for from 0 to 5 charged particles, and, for comparison, the corresponding diagram of a U-fission by thermal neutrons. Whereas the U-fission curves show a monotonous course, this is not the case with Bi-fission curves. The diagrams are discussed in detail. For 0, 1, 2, 3 charged particles the l -maximum is near a range asymmetry of 1.52; the diagram for 4 and 5 emitted particles shows a second maximum in the range of $l_1/l_h = 1.82$. Finally, the formulae

$$l_1/l_h = (Z_h/Z_1)^{2/3} f(Z_h, Z_1)$$

$$\text{with } f(Z_h, Z_1) = \left[3(2Z_h^{1/3})^{-1/3} + (2Z_h^{1/3})^{-1} \right] / \left[3(2Z_1^{1/3})^{-1/3} + (2Z_1^{1/3})^{-1} \right]$$

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The Peculiar Features of Bi-Nuclear Fission at Very High Excitation Energies

$$\text{and } l_1/l_h = 1.1(Z_h/Z_1)^{2/3} f(Z_h, Z_1)$$

are discussed, and the attempt is made to explain experimental results on the basis of the shell structure of product nuclei. There are 2 figures and 16 references, 7 of which are Soviet.

ASSOCIATION: Radiyevyy institut Akademii nauk SSSR
(Radium Institute of the Academy of Sciences, USSR)

SUBMITTED: June 28, 1958

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PERFILOV, N.A.; PROKOP'YEVA, Ye.I.; NOVIKOVA, N.R.; LOZHKIN, O.V.;
DAROVSKIKH, V.F.; DENISENKO, G.F.

Manufacturing principle and properties of extra-fine grain
emulsions for nuclear investigations. Zhur.nauch.i prikl.fot.
i kin. 5 no.4:262-273 J1-Ag '60. (MIRA 13:8)

1. Radiyevyy institut im. V.O.Khlopina AN SSSR.
(Photographic emulsions)
(Photography, Particle track)

PERFILOV, N. A.

82010
S/056/60/038/02/06/061
B006/B011

21.5200
24.6600
AUTHORS:

Perfilov, N. A., Ivanova, N. S., Lozhkin, O. V.,
Makarov, M. N., Ostroumov, V. I., Solov'yeva, Z. I.,
Shamoy, V. P.

TITLE:

Fragmentation of Ag and Br Nuclei at Proton Energies of
9 Bev

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
Vol. 38, No. 2, pp. 345 - 350

TEXT: The authors of the paper under review offer the first results obtained from their investigation of Ag and Br fragmentation (nuclear disintegration in multicharged particles with $Z \geq 4$) by 9-Bev protons. Small emulsion chambers consisting of ten layers of the π -P (P-R) emulsion (200 μ thick) were irradiated on the proton synchrotron of the OIYai (Joint Institute of Nuclear Research) with a 9-Bev proton beam. The individual layers were numbered by a method by V. M. Sidorov and M. I. Trukhin. In the interpretation of the emulsions, such nuclear disintegrations were selected as contained tracks of particles with $Z \geq 4$.

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Fragmentation of Ag and Br Nuclei at Proton
Energies of 9 Bev

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Depending on the proton energy, the disintegrations were divided into "black" ($E_p < 30$ Mev), "gray" ($E_p \leq 1$ Bev), and "thin" ($E_p > 1$ Bev) ones. For the charge determination, the integral track width was determined with an ocular micrometer. On interpreting the results, the authors found 1,028 disintegrations with four or more prongs each; among them were, as an analysis revealed, 188 ordinary ones having fragments with $Z \geq 4$. Further 709 events were established, in which such fragments occurred, that is a total of 997 disintegrations having fragments with $Z \geq 4$ [Abstracter's Note: One of the above figures must be wrong, since $188 + 709 = 897$]. The experimental results are described in detail. a) Characterization of nuclear disintegrations with fragments. A table specifies the average prong numbers for the individual star types. The average number of particles is considerably higher in disintegrations with fragments than it is in ordinary disintegrations, especially in disintegrations with several fragments and in such with fast fragments (range $> 100 \mu$). b) Production cross section of stars with fragments. For stars having fragments with $Z \geq 4$ in Ag- and Br disintegrations it was found to be 100 ± 30 mb, viz.

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Fragmentation of Ag and Br Nuclei at Proton
Energies of 9 Bev

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about 10% of the total inelastic interaction cross section. Fig. 2 illustrates the fragmentation cross section as a function of E_p . In the range of proton energies around 1 Bev there appears a steep climb of the cross section. c) Multiplicity in fragment production. The quantity of stars with two or more tracks of multicharged particles is found to grow with the energy of bombarding protons. At $E_p = 9$ Bev this relative quantity amounts to 0.2, at 660 Mev 0.05 only. d) Nature of fragments. Fig. 3 shows the charge distribution of the fragments: The number of particles decreases in a practically linear manner with growing charge. The charge distribution differs only little from the one found at lower energies of the bombarding particles. e) Angular and energy distributions of the fragments. Their angular distribution was determined by a method by V. I. Ostroumov and R. A. Pilov; it is illustrated in Fig. 4 with respect to the proton direction of incidence (for events with one fragment, with fast fragments, and with two or more fragments). Distribution becomes more anisotropic with increasing fragment energy. The forward-backward ratio is 3.6 ± 1.1 at $R > 100 \mu$. The angular distribution is less anisotropic at $E_p = 9$ Bev with respect to the proton direction.

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Fragmentation of Ag and Br Nuclei at Proton
Energies of 9 Bev

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S/056/60/038/02/06/061
B006/B011

tion than it is at $E_p < 1$ Bev. The three diagrams of Fig. 6 show the energy distribution for particles with the charges 4, 5, and 6. It is only little dependent on E_p (cf. Fig. 7). f) Hyperfragment production.

Three cases of a hyperfragment production (one of them with a charge equal to 6) were recorded among the 997 fragmentation events. The authors finally thank the team of the laboratoriya vysokikh energii Ob"yedinennogo instituta yadernykh issledovaniy (High-energy Laboratory of the Joint Institute of Nuclear Research) for assistance given in the irradiation of the emulsion chambers. There are 7 figures, 1 table, and 9 references: 8 Soviet and 1 Japanese.

ASSOCIATION: Radiyevyy institut Akademii nauk SSSR (Radium Institute
of the Academy of Sciences, USSR)

SUBMITTED: August 1, 1959

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82410

S/056/60/038/03/06/033
BCC6/B014

24.6600

AUTHORS:

Perfilov, N. A., Darovskikh, V. F., Denisenko, G. F.,
Obukhov, A. I.

TITLE:

Fission of Uranium Nuclei Induced by 9-Bev Protons

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
Vol. 38, No. 3, pp. 716-718

TEXT: In the article under consideration, the authors bombarded nuclear emulsions of the type P-9Ch containing naturally-occurring uranium with 9-Bev protons on the proton synchrotron of the OIYaI. When evaluating the plates the authors selected only such events in which two tracks occurred in addition to the tracks of light-charged particles (usually protons or alpha particles); tracks of fission fragments induced by thermal neutrons corresponded to the blackening intensity of these. The range ratio of light and heavy fragments was $L_1/L_H < 2$. The authors confined themselves to such cases in which a considerable fragmentation admixture was observable at $L_1/L_H > 2$. Altogether, 1,042 such stars were recorded. The fission cross section was \times

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S/056/60/036/03/08/033
B006/B014

Fission of Uranium Nuclei Induced by 9-Bev Protons

calculated from the formula $\sigma_f = N_f / N_{\text{nucl}} N_p$, where N_f denotes the number of fissions found per cm^3 , N_{nucl} the number of uranium nuclei per cm^3 , and N_p the proton flux. It was found that $\sigma_f = (1.3 \pm 0.4)$ barns. When 9-Bev protons interact with the nuclei of the emulsion secondaries with $E < 9$ Bev occur which make some contribution to the cross section. This background is considered to be $\sim 30\%$, so that the true value of σ_f is likely to be ~ 0.9 barn. The mass ratio of fragments may be calculated from the value L_1/L_h . Fig. 1 shows the distribution of the fission events, which were accompanied by the departure of charged particles, as dependent on L_1/L_h . Hence it follows that fissions with a mass ratio of the fragments of almost unity are the most probable. Fig. 2 shows the dependence of the sum of average range of the fragments on L_1/L_h . The distribution exhibits three peaks. The results obtained by studying the angular distribution of the said fragments are also given. The ratio between the particle number in two angular ranges, $N(0-30^\circ)/N(60-90^\circ)$ was 1.07 ± 0.11 , i.e., the distribution was isotropic.

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Fission of Uranium Nuclei Induced by
9-Bev Protons

S/056, 64, 036, 03, 03, 03
B006, B014

within the statistical limits of error. The distribution of the fission events according to the number of the accompanying "black" prongs is illustrated in Fig. 3. It was found that $\bar{n}_{sp} = 3.82$, while $n_p = 1.16$ at 660 Mev. In conclusion, the authors thank the team of the laboratoriya vysokikh energiy OIYAI (High-energy Laboratory of the Joint Institute of Nuclear Research) for their assistance in carrying out the bombardment. There are 3 figures and 5 Soviet references.

ASSOCIATION: Radiyevyy institut Akademii nauk SSSR (Radium Institute of the
Academy of Sciences, USSR)

SUBMITTED: September 10, 1959

Card 3/3

83718

S/056/60/038/004/011/048
B019/B070

24.6600
AUTHORS:

Arifkhanov, U. R., Makarov, M. M., Perfilov, N. A.,
Shamov, V. P.

TITLE:

Production of Fragments Under the Action of 100-Mev Protons

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
Vol. 38, No. 4, pp. 1115-1122

TEXT: The authors have investigated the fragment production of the nuclei of a photoemulsion. The emulsion used was of type П-9 (γ) (P-9 (ch)), which allowed the observation of the charged products of nuclear fragmentations, and a visual study of the multiply charged particles with $Z \geq 3$, of α particles, or protons. The experiments were carried out at the synchrocyclotron of the OIYaI (Joint Institute of Nuclear Research). Fig. 1 shows the experimentally observed fragment production cross section as function of the photon energies for heavy and light nuclei. Fig. 2 shows the reduced probability for the departure of fragments from a heavy nucleus as a function of the number of prongs of a star. In the fragmentation of Ag and Br, the following fragments

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8497

S/056/60/038/005/051/057/XX
B006/B070

24.6600

AUTHORS:

Lozhkin, O.V., Perfilov, N. A., Rimskiy-Korsakov, A. A.,
Fromlin, J., Professor of Birmingham University, Great
Britain

TITLE:

Nuclear Disintegration¹⁹ in a Photographic Emulsion Caused by
930-Mev Protons

PERIODICAL:

Zhurnal eksperimental'noy i teoreticheskoy fiziki, 1960,
Vol. 38, No. 5, pp. 1388 - 1398

TEXT: The present paper presents experimental investigations on the interaction of 930-Mev protons with emulsion nuclei, taking into particular consideration disintegrations with an emission of fragments with $Z \geq 3$. Particularly fine-grained emulsions of the type $\pi - P(P-R)$, prepared in the laboratory of N. A. Perfilov, were used for the experiments. The irradiation was performed on the proton synchrotron in Birmingham. Fig. 1 shows the sensitivity characteristic of the P-R emulsion (without sensitizing with triethanol amine). Particles with $Z = 1 - 3$ were identified by the "scale method" first used by Yu. I. Serebrennikov (Ref. 6). The disintegration events were divided into heavy and light emulsion nuclei according to

Card 1/4

Nuclear Disintegration in a Photographic
Emulsion Caused by 930-Mev Protons

84973

S/056/60/038/005/051/057/XX
B006/B070

1) the charge sum of the particles in the disintegration ($\Sigma Z > 8$ - heavy nuclei), 2) the existence or nonexistence of recoil nuclei (existence - heavy nuclei), 3) the existence or nonexistence of short-range alpha particles ($< 50\mu$) or protons ($< 100\mu$) (existence - light nuclei). A total of 1054 stars with three or more prongs were analyzed, 905 of which were described as disintegrations of heavy nuclei and 149 of light nuclei. 11 events were established with two fragments having $12 > Z \geq 4$ with opposite directions of emission (8μ). These events, according to V. P. Shamov, are due to the disintegration of silver nuclei; of all stars with $Z \geq 4$ fragments about 5% were such. Fig. 2 shows the blackening distribution; Fig. 3 shows the distribution of $Z \geq 4$ fragment tracks with respect to their integral width. Figs. 4 and 5 show the relative probabilities of emission of $Z \geq 4$ fragments as a function of the particles participating in the disintegration at $E_p < 30$, ≥ 30 , and ≥ 100 Mev for Ag and Br nuclei. Fig. 6 shows the energy distribution of Li fragments in the disintegration of Ag and Br nuclei by 930-Mev and 6.2-Bev protons. Fig. 7 shows the distribution of solid angles between the fragments and the fast cascade particles. The numerical results for stars with three or more prongs are collected in a table:

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Nuclear Disintegration in a Photographic
Emulsion Caused by 930-Mev Protons

84973

S/056/60/038/005/051/057/XX
B006/B070

11 figures, 1 table, and 27 references: 11 Soviet, 2 British, 1 French,
1 Italian, 1 Japanese, and 11 US.

ASSOCIATION: Radiyevyy institut Akademii nauk SSSR (Radium Institute of
the Academy of Sciences USSR)

SUBMITTED: November 18, 1959

Card 4/4

PERFILOV, N. A.

S/056/60/039/01/16/029
B006/B063

AUTHORS: Ostroumov, V. I., Perfilov, N. A., Filov, R. A.
TITLE: The Energy Spectrum of Cascade Alpha Particles¹⁹ in
Photoemulsion Stars Produced by High-energy Protons
PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki,
1960, Vol. 39, No. 1(7), pp. 105-107

TEXT: Following two previous papers (Refs. 1 and 2) in which a theoretical method was developed and similar problems were studied, the authors describe the calculation of the energy spectrum of fast cascade alpha particles, which was carried out to determine the velocity of the alpha particle in the nucleus (since the energy distribution of the recoil particles depends on their primary momentum). The formulas used for calculation were taken from the paper of Ref. 1. The model underlying the calculation is based on the assumption of single elastic collision between cascade nucleons and intranuclear alpha particles. The calculation was made for alpha particles departing with energies of more than 30 Mev during the disintegration of heavy photoemulsion nuclei. The disintegrations are assumed to have been

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The Energy Spectrum of Cascade Alpha Particles
in Photoemulsion Stars Produced by High-energy
Protons

S/056/60/039/01/16/029
B006/B063

released by protons of 140, 200, 360, and 660 Mev. The accompanying figure shows the experimental α -spectrum for $T = 30$ Mev (T denotes the lower limit of the kinetic energy of the α -particles), which was obtained by observing stars of Ag and Br nuclei induced by 660-Mev protons (the alpha spectra taken at proton energies of 140, 200, and 360 Mev have the same shape). The diagram also contains the theoretical distribution curves; these calculations were made for different kinetic energies, W , of intranuclear alpha particles; the diagram shows the curves obtained for $W = 0$ and $W = 5$ Mev. The theoretical curve for $W = 5$ Mev gives a better description of the experimental distribution than the theoretical curve for $W = 0$ Mev. This means that an alpha particle moving in the nucleus is more probable in this model than an alpha particle at rest. As the curves calculated for $W = 5 + 20$ Mev practically yield the same results, the authors studied the momentum distribution of alpha particles in the nucleus. It was found that the best values for W were obtained between 5 and 10 Mev. In Ref. 4 $W = 6$ was found for alpha particles in the C^{12} nucleus. There are 1 figure and 4 references: 3 Soviet and 1 French. ✓B

Card 2/3

21(7)

AUTHORS:

Perfilov, N. A.

Lozhkin, O. V., Shamov, V. P.

S/053/60/070/01/001/007
B006/B017

TITLE:

The Processes of Fragmentation and Fission¹⁹ in the Interaction
Between High-energy Particles and Nuclei

PERIODICAL:

Uspekhi fizicheskikh nauk, 1960, Vol 70, Nr 1, pp 3-56 (USSR)

ABSTRACT:

The present paper gives a detailed survey on the fundamental problems of nuclear fragmentation and fission. From the large number of publications available in this field individual examples are chosen and discussed to illustrate the chapters. In the introduction the cascade evaporation model used for describing nuclear reactions induced by particles with energies ranging from 10^2 to 10^4 Mev is discussed and the conclusions drawn from this model are investigated individually. Part I deals with fragmentation. Fragmentation is any form of nuclear disintegration on which multiply-charged particles with $Z > 3$ are formed. The individual sections of this part deal with 1) fragmentation cross section; a three-page table and a number of well selected diagrams illustrate the effects influencing the cross sections. 2) The multiplicity in the fragmenta-

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The Processes of Fragmentation and Fission
in the Interaction Between High-energy
Particles and Nuclei

S/053/60/070/01/001/007
B006/B017

tion process; 3) the nature of the fragments produced, 4) energy distribution of the fragments (Figs 11, 12, 13); 5) angular distribution of the fragments (Fig 14, Table 3); 6) the properties of the residual nuclei; 7) the mechanism of fragmentation (nuclear cascade process, particle evaporation of the excited nucleus, process of asymmetrical nuclear fission, hypotheses on the fragmentation process). Part II deals with the characteristics and the experimental results of nuclear fission at high excitation energies. Section 1: fission cross sections; section 2: angular distribution of the fission fragments, section 3: mass spectra in fission (Figs 19, 20, 21); section 4: fission mechanism and the methods of its determination (investigation of the energy spectrum and of the number of charged particles - photomethod; analysis of the ranges of the fragments in the case of different primary excitation energies; investigation of the angular correlations of the emitted particles with the fragments; Monte Carlo method). For each of these methods which are individually described the authors give examples (mainly taken from western publications). In the paper ✓

Card 2/3

PERFILOV, N.A.; ROMANOV, Yu.F.; SOLOV'YEVA, Z.I.

Fission of heavy nuclei with emission of long-range
alpha particles. Usp.fiz.nauk 71 no.3:471-483
Jl '60. (MIRA 13:7)

(Nuclear fission)

VASIL'YEV, V.V.; LYALIKOV, K.S.; PERFILOV, N.A.

Sensitivity of extra-fine grained P-9 emulsions to the visible spectrum
and their optical sensitization. Zhur. nauch. i prikl. fot. i kin.
6 no. 3:227-229 My '61. (MIRA 14:5)

1. Leningradskiy institut kinoinzhenerov.
(Photographic emulsions)

PERFILOV, N.A.; NOVIKOVA, N.R.; ZAKHAROV, V.I.

Investigating the anomalous recrystallization of extrafine grain
nuclear emulsions during the second ripening. Zhur.nauch.i prikl.
fot. i kin. 6 no.5:338-344 S-O '61. (MIRA 14:9)

1. Radiyevyy institut AN SSSR.
(Photography, Particle track)
(Photographic emulsions)

PERFILOV, N.A.; NOVIKOVA, N.R.; ZAKHAROV, V.I.; VIKHREV, Yu.I.

Photographic emulsion PR-2 for nuclear research. Atom. energ. 11
no.6: 543-544 D '61. (MIRA 14:11)
(Photographic emulsions) (Nuclear research)

S/056/61/040/002/002/047
B113/B214

AUTHORS: Perfilov, N. A. , Serebrennikov, Yu. I.

TITLE: Interaction of 660-Mev protons with carbon, nitrogen, and oxygen nuclei

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 40, no. 2, 1961, 400-408

TEXT: In order to make precise the disintegration mechanism, a more exact experimental study is carried out of the disintegrations of C, N, and O nuclei by high energy protons ($E > 500$ Mev). The nuclear disintegrations were detected by means of three-layer photographic plates having a gelatin layer (2μ) between two layers of the emulsion $\Pi-9$ (P-9) each 100μ thick. The emulsion P 9 was sensitive to protons with energy $E_p < 30$ Mev and in it only charged particles with black traces were

recorded. The emulsion and the plates were prepared in the laboratory of Professor N. A. Perfilov at the Radium Institute, AS USSR. The photographic plates were irradiated by 660-Mev protons in the synchrotron of the Ob'yedinennyy institut yadarnykh issledovaniy (Joint Institute of

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Interaction of 660-Mev protons

S/056/61/040/002/002/047
B113/B214

Nuclear Research), the proton beam being parallel to the surface of the emulsion. The kinetic energy, E , of the charged particles at the end of their path in the gelatin and the emulsion was determined from the relation $E = E(R_1) + 0.6[E(R_1 + R_2) - E(R_1)]$ (1), where R_1 and R_2 are the ranges in the emulsion and the gelatin layer, respectively, and $E(R)$ is the energy of the particle corresponding to the range R in the emulsion. A total of 1044 disintegrations of C, N, and O nuclei were recorded. The mean number of black rays per star amounted to 3.25, of which 1.94 were attributed to alpha particles and 1.29 to protons, the ratio α/p being 1.5. On account of the limited sensitivity of the photographic plate in this experiment about 0.75 of the fast protons ($E_p > 30$ Mev) in each

disintegration were not detected. If all the particles originate from a nuclear disintegration and fly with the mean velocity v in the direction of the proton beam, v is proportional to the forward-to-backward ratio of the energy spectrum and to the angular distribution of the particles in the laboratory system. From the experimental values, the distribution curves of the alpha particles and the protons were calculated on the assumption that the angular distributions in the center-of-mass system of

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Interaction of 660-Mev protons

S/056/61/040/002/002/047
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the residual nucleus are isotropic. Comparison of the angular distributions of alpha particles for different energies showed that they are practically coincident for all $E_\alpha \leq 8$ Mev. A similar correlation for protons is not so clearly seen. The energy and angular distributions of the particles were also considered for a coordinate system moving with the velocity $v = 3.5 \cdot 10^8$ cm/sec in the direction of the proton beam. It was found here that the angular distribution of the alpha particles was coincident with the isotropic distributions. The experimental results in the center-of-mass system of the primary nucleus show that the majority of the events of disintegration of C, N, and O nuclei by 660-Mev protons take place in two stages according to Serber (Phys.Rev. 72, 1114, 1947). It was observed that the ejected protons could have small energies up to 1.5 Mev. The ejected alpha particles had energies $E \geq 8$ Mev. From a knowledge of the numbers of the ejected particles, the mean values of the charge Z and the mass number \bar{A} of the residual nucleus can be calculated: $\bar{Z} = Z_0 - (n_p + 2n_\alpha) = 5.2$; $\bar{A} = \bar{A}_0 - (n_p + n_n + 4n_\alpha) = 10.4$. Here, the mean number, n_n , of promptly ejected neutrons per

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Interaction of 660 Mev protons

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disintegration event is equal to the number of promptly ejected protons (n_p): $n_n = n_p = 1.03$; $n_\alpha = 0.2$. The excitation energy of the residual nucleus can also be determined if the number of emitted particles and their mean kinetic energy in the center-of-mass system of the residual nucleus are known. The mean lifetime of the alpha particles in the nucleus was found to be $\tau_\alpha \approx 4 \cdot 10^{-23}$ sec. V. I. Ostroumov is thanked for discussions of several questions concerning this paper. Ye. L. Grigor'yev, G. A. Leksin, and B. S. Neganov, assistants at the Joint Institute of Nuclear Research, are thanked for their help in conducting the experiment at the synchrotron of the Institute. There are 7 figures and 16 references: 5 Soviet bloc and 11 non-Soviet-bloc. ✓

ASSOCIATION: Radiyevyy institut Akademii nauk SSSR (Radium Institute of the Academy of Sciences USSR)

SUBMITTED: June 28, 1960

Card 4/4

OBUKHOV, A.I.; PERFILOV, N.A.

Anisotropy in the fission of bismuth and uranium irradiated
by 660 Mev. protons. Zhur. eksp. i teor. fis. 40 no.5:1250-1252
My '61. (MIRA 14:7)

1. Radiyevyy institut AN SSSR.
(Nuclear fission) (Protons)

PERFILOV, N.A.; SOLOV'YEVA, Z.I.; FILOV, R.A.

Triple fission of uranium nuclei by fast neutrons. Zhur.eksp.i teor.
fiz. 41 no.1:11-12 J1 '61. (MIRA 14:7)

1. Radiyevyy institut AN SSSR.
(Nuclear fission) (Uranium isotopes) (Neutrons)

GORICHEV, P.A.; LOZHKIN, O.V.; PERFILOV, N.A.

Charge distribution of fragments in nuclear fission. Zhur.eksp.i teor.
fiz. 41 no.1:35-37 J1 '61. (MIRA 14:7)

1. Radiyevyy institut AN SSSR.
(Nuclear fission)

28760
S/056/61/041/003/013/020
B125/B102

24.6600

AUTHOR: Perfilov, N. A.

TITLE: Fissility of nuclei at high proton energies

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41,
no. 3(9), 1961, 871 - 873

TEAT: Experimental data on nuclear fission by high-energy protons are studied, and the relation between the limiting values of the fission cross section σ_f and the parameter Z^2/A is established. At sufficiently high proton energies, the ratio σ_f/σ_t is no longer a function of this energy. For uranium and thorium, this is reached at $E_p > 100$ Mev. At $E_p = 300$ Mev, σ_f for uranium measures 1.3 barn and for thorium 0.8 barn; at $E_p = 9$ Bev, the uranium fission cross section is still ~ 1.3 barn. For $E_p \approx 350$ Mev, Au^{197} did not reach its maximum value of fissility ($\sigma_f \approx 0.05$ b) but came close to it. At $E_p = 660$ Mev, σ_f for W measures 11 ± 3 , for Ta 8 ± 3 , for Card 1/3

Fissility of nuclei at high proton ...

84760
S/056/61/041/003/013/020
B125/B102

La¹³⁴ 0.6, and for Sb¹²² 0.25 millibarn, $\sigma_f(\text{Ag})$ is 0.3 millibarn according to V. P. Shamov (ZhETF, 35, 316, 1958) but ≈ 0.05 millibarn according to K. Kofstad. Plotting $\log(\sigma_f/\sigma_t)$ as a function of Z^2/A shows that the experimental data are nearly located on a straight line. The values for Ag, Sb, and La lie somewhat above this line. Perhaps, these deviations are caused by a non-classical fission mechanism or by fragmentation. The author thinks the latter more probable. The straight line can be expressed by $\sigma_f/\sigma_t = \exp \{0.682 [Z^2/A - 36.25]\}$, and for $Z^2/A \approx 36.25$ the cross section of the inelastic interaction is completely determined by fission. The representation in the form of an exponential function may give a hint for a uniform fission mechanism in a wide interval. There are 1 table and 11 references: 7 Soviet and 4 non-Soviet. The four references to English-language publications read as follows: H. Steiner, J. Jungerman. Phys. Rev., 101, 807, 1956; G. Millburn, W. Birnbaum, W. Crandall, L. Schecter. Phys. Rev., 95, 1268, 1954; R. Wolfgang, E. Baker, A. Caretto, J. Cumming, G. Friedlander, J. Hudis, Phys. Rev., 103, 394, 1956; K. Kofstad. UCRL-2265, 1953.

Card 2/3

Fissility of nuclei at high proton ...

2⁸760
S/C56/61/041/003/C13/C20
B125/B102

X

ASSOCIATION: Radiyevyy institut Akademii nauk SSSR (Radium Institute of
the Academy of Sciences USSR)

SUBMITTED: April 5, 1960

Card 3/3

PERFILOV, N.A.; SOLOV'YEV, E.I.; FILOV, A.A.; KULEBNIKOV, G.I.

Spontaneous triple fission of curium-242. Dokl. AN SSSR 196
no. 3:581-582 Ja '61. (MIRA 14:2)

1. Kadijevyy institut imeni V.G. Khlopina AN SSSR. Predstavleno
akademičkom E. . Konstantinovym.
(Curium---Decay)

MAKAROV, M.M.; PERFILOV, N.A.

Fragmentation on light nuclei. Dokl. AN SSSR 138 no.3:579-580 My
'61. (MIRA 14:5)

1. Radiyevyy institut im. V.G.Khlopina AN SSSR. Predstavleno
akademikom B.P.Konstantinovym.
(Nuclear reactions)

PERFILOV, N.A., doktor fiz.-mat. nauk, red.; EYSMONT, V.P., kand. fiz.-
mat. nauk, red.; VORONOVA, A.I., red.; MAZEL', Ye.M., tekhn.
red.

[Physics of nuclear fission] Fizika deleniia atomnykh iader;
sbornik statei. Moskva, Gosatomizdat, 1962. 241 p.
(MIRA 15:7)

(Nuclear fission)

BOGOMOLOV, K.S., red.; PERFILOV, N.A., red.; BELOVITSKIY, G.Ye., red.;
DOBROSERDOVA, Ye.P., red.; ZHDANOV, G.B., red.; KARTUZHANSKIY,
A.L., red.; LYUBOMILOV, S.I., red.; MINERVINA, Z.V., red.;
RAZORENOVA, I.F., red.; ROMANOVSKAYA, K.M., red.; SAMOYLOVICH,
D.M., red.; STARININ, K.V., red.; TRET'YAKOVA, M.I., red.;
UVAROVA, V.M., red.; SHUR, L.I., red.; POPOVA, A.K., red.; VEPRIK,
Ya.M., red.; VERES, L.F., red. izd-va; KUZNETSOVA, Ye.B., red. izd-
va; POINAKOVA, T.V., tekhn. red.

[Nuclear photography; transactions] IAdernaia fotografiia; trudy
tret'ego Mezhdunarodnogo soveshchaniia. Moskva, Izd-vo Akad. nauk
SSSR, 1962. 474 p. (MIRA 15:6)

1. Colloque International de Photographie Corpusculaire. 3d,
Moscow, 1960. 2. Nauchno-issledovatel'skiy kinofotoinstitut,
Moskva (for Bogomolov, Uvarova, Romanovskaya, Starinin). 3. Pred-
sedatel' Organizatsionnogo komiteta Tret'yego Mezhdunarodnogo sove-
shchaniya po yadernoy fotografii. 1960, Moskva (for Bogomolov).
4. Zamestitel' predsedatelya Organizatsionnogo komiteta Tre'yego
Mezhdunarodnogo soveshchaniya po yadernoy fotografii. 1960, Moskva
(for Perfilov). 5. Radiyevyy institut im. V.G.Khlopina Akademii
nauk, Leningrad (for Shur, Perfilov). 6. Institut sovetskoy trgovli
im. F.Engel'sa (for Kartuzhanskiy). 7. Ob'yedinennyy institut yader-
nykh issledovaniy, Dubna (for Lyubomilov). 8. Institut atomnoy
energii im. I.V.Kurchatova Akademii nauk SSSR, Moskva (for
Samoylovich).

(Photography, Particle track)

PERFILOV, N. A.

PHASE I BOOK EXPLOITATION

SOV/6253

Perfilov, Nikolay Aleksandrovich, Oleg Vladimirovich Lozhkin, and Vsevolod Ivanovich Ostroumov

Yadernyye reaktsii pod deystviyem chastits vysokikh energiy (Nuclear Reactions Under the Action of High-Energy Particles). Moscow, Izd-vo AN SSSR, 1962. 250 p. Errata slip inserted. 3000 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Radiyevyy institut im. V. G. Khlopina.

Eds. of Publishing House: I. V. Suvorov and T. I. Kulagina; Tech. Ed.: M. N. Kondrat'yeva.

PURPOSE: The book is intended for experimental physicists and radiochemists concerned with the investigation of nuclear reactions at high energies, as well as for students in advanced courses in the physics of atomic nuclei.

Card 1/2

PERFILOV, N.A.; NOVIKOVA, N.R.; ZAKHAROV, V.I.

Magnitude and structure of the developed grains in extra
fine-grained nuclear emulsions. Zhur.nauch.i prikl.fot.i
kin. 8 no.1:62-63 Ja-F '63. (MIRA 16:2)

1. Radiyevyy institut AN SSSR imeni V.G.Khlopina.
(Photography, Particle track) (Photographic emulsions)

KOCHEROV, N.P.; PERFILOV, N.A.

Changes in the tracks of α -particles and electrons taking
place in the development of nuclear emulsions. Zhur. nauch.
i prikl. fot. i kin. 8 no.6:416-419 N-D '63.

(MIRA 17:1)

L 10677-63

EPF(n)-2/ENT(m)/BDS--EFTC/ASD/FWL/SSD--Pu-4

ACCESSION NR: AP3002265

3/0089/63/014/ 006/0575/0577

AUTHOR: Perfilov, N. A.; Solov'yeva, Z. I.; Filov, R. A.

TITLE: Triple fission of U sup 235 by neutrons of 14 mev energy

SOURCE: Atomnaya energiya, v. 14, no. 6, 1963, 575-577

TOPIC TAGS: triple uranium fission, neutron uranium fission

ABSTRACT: The triple splitting of uranium nucleus (fission plus the formation of a high energy alpha particle) was observed in a previous work to be more probable for bombardment with thermal neutrons than with fast ones. However, these observations were made with different isotopes: thermal neutrons with U sup 235, fast neutrons with U sup 238. Therefore, neutrons of 14 Mev were used with U sup 235 in this study. Photoemulsions P-9-0 were soaked in uranium salt solutions and irradiated in the neutron beam from the reactor t(d,n) He sup 4. About 100 thousand fission events were observed, among them 65 triple ones. The energy spectrum of alpha particles and their angular distribution were observed and given in diagrams. They are approximately the same for thermal and for fast neutrons. The probability of triple splitting decreases with the increase of the isotopic mass. Orig. art. has: 3 figures.

Card 1/1

L 13613-63 EWT(m)/BDS AFMTC/ASD
ACCESSION NR: AP3003107

S/0056/63/044/006/1832/1836 54
53

AUTHOR: Perfilov, N. A.; Solov'yeva, Z. I.; Filov, R. A.; Khlebnikov, G. I.

TITLE: Ternary fission of plutonium 19

SOURCE: Zhurnal eksper. i teor. fiziki, v. 44, no. 6, 1963, 1832-1836

TOPIC TAGS: ternary fission of plutonium, Alpha particle energy spectra, plutonium thermal fission, uranium complex fission

ABSTRACT: The energy spectra of long-range Alpha particles produced in the spontaneous fission of Pu sup 238 and Pu sup 240 and in thermal fission of Pu sup 239 have been studied by the nuclear emulsion method with an aim at comparing both the fission probabilities and the fission Alpha-particle energy spectra of the different isotopes. Electrolytic films of Pu sup 238 and sup 240, containing 78 plus or minus 4 and 450 plus or minus 25 microgram respectively were used in the spontaneous fission test, and Pu sup 239 film irradiated with neutrons from the reactor of FTI AN SSSR was used to obtain the alpha-particle energy spectrum from thermal-neutron fission. The photographic plates were scanned with a microscope and the resultant histograms were tested for fits to Gaussian distributions with various maxima and half-widths. The spectrum shapes are discussed and compared
Card 1/52

L 13613-63

ACCESSION NR: AP3003107

with the results for complex uranium fission. Logical reasons for representing the Alpha-particle spectra as Gaussian or near-Gaussian distributions are advanced and agreement in the case of ternary fission of Pu sup 240 is noted with recent work by R. A. Nobles (Phys. Rev. v. 126, 1508 (1962)). "In conclusion, the authors wish to thank V. M. Kulakov for experimental assistance." Orig. art. has: 2 figures, 1 formula, and 2 tables.

ASSOCIATION: none

SUBMITTED: 17Jan63

DATE ACQ: 23Jul63

ENCL: 003

SUB CODE: 00

NO REF SOV: 008

OTHER: 007

Card 2/12

YAKOVLEV, V. V.; BOGATIN, V. I.; LOZHKIN, O. V.; PERFILOV, N. A.; YAKOVLEV, Yu. P.

"Concerning the Possibility of Investigation of Multi-Nucleon Clustering in the Periphery of Nuclei by Reactions with Fast Particles."

report submitted for All-Union Conf on Nuclear Spectroscopy, Tbilisi, 14-22 Feb 64.

Radium Inst.

ZAKHAROV, V.I.; NOVIKOVA, N.R.; PERFILOV, N. A.; FADINA, Ye.V.

Properties of fine-frain nuclear emulsions dependent on the pAg
and the temperature of emulsification and first ripening.

Zhur. nauch. i prikl. fot. i kin. 9 no.1:21-27 Ja-F'64.

(MIRA 17:2)

8/0077/64/009/002/0083/0090

ACCESSION NR: AP4026814

AUTHORS: Gorichev, P. A.; Loshkin, O. V.; Perfilov, N. A.

TITLE: Discrimination of heavy ions in nuclear emulsions

SOURCE: Zhurnal nauchnoy i prikladnoy fotografii i kinematografii, v. 9, no. 2, 1964, 83-90

TOPIC TAGS: nuclear emulsion, heavy ion, residual path, microcrystal, electron, single charge ion, ion track

ABSTRACT: To discriminate tracks of single charge ions as a function of various emulsion properties the P. G. Bizzeti-M. Della Corte model (Nuovo Cimento, 1959, 11, 317) has been used and refined specifically for the "path-energy" of a δ - electron.

The discrimination coefficient D for B^{10} and C^{12} ions in various emulsions (e.g., $P9_0 - 0.06\mu$, $P9_{ch} - 0.06\mu$, $PR - 0.08\mu$, etc.) as a function of R, the residual ion path, has been determined experimentally and compared to calculations from the general expression $\lambda(z, \beta, d, s) = \lambda_0(d) + 2x(z, \beta, d, s)$, where λ - track width,

z - charge, β - speed, d - mean microcrystal diameter of emulsions, s - sensitivity, and $\lambda_0 = (1 + g)d$. Comparing D for $B^{10} - C^{12}$ in $P9_0$, $P9_{ch}$, PR , and

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ACCESSION NR: AP4026814

PR+6% TEA for a given AgBr microcrystal dimension, D increases with increase in emulsion sensitivity. These results yield optimum conditions for superior ion discrimination in the region $z = 3$ to 10 by showing maximum sensitivity and minimum emulsion microcrystal dimensions. Also included are experimental curves of $E(x)$ - energy versus x for C^{12} ions with several residual ion paths in PR emulsion. Orig. art. has: 8 figures and 6 equations.

ASSOCIATION: none

SUBMITTED: 28Sep62

SUB CODE: NP

DATE ACQ: 16Apr64

NO REF SOV: 001

ENCL: 00

OTHER: 007

Card 2/2

GORICHEV, P.A.; LOZHKIN, O.V.; PERFILOV, N.A.

Theory of the nuclear structure and manifesting itself in
interactions between high-energy particles and nuclei.

Izv. AN SSSR. Ser. fiz. 26 no.9:1190-1193

MIRA 15:6)

(Nuclear reactions)

(Nuclear models)

I.15376-65 EWT(m) DIAAP/SSD/AFWL/RAEM(c)/ESD(t)
 ACCESSION NR: AP4048630

S/0048/64/028/010/1573/1577 **B**

AUTHOR: Avdeychikov, V.V.; Bogatyn, V.I.; Lozhkin, O.V.; Perfilov, N.A.; Yakovlev, Yu.P.

¹⁹
 TITLE: Many-nucleon clusters in the peripheral nuclear region evinced in reactions with fast particles /Report, Fourteenth Annual Conference on Nuclear Spectroscopy held in Tbilisi 14-22 Feb 1964/

SOURCE: AN SSSR. Izv. Seriya fizicheskaya, v.28, no.10, 1964, 1573-1577

TOPIC TAGS: nuclear physics, nucleon clusters, carbon, aluminum, vanadium

ABSTRACT: The energy and angular distributions of Li^8 nuclei ejected from Cl^{12} , Al^{27} and V^{51} by 660 MeV protons were investigated. Three of the authors have described the experimental technique elsewhere (Doklady* AN SSSR 151,826,1963). The energy distribution was found to depend on the angle of expulsion. At low angles all the spectra have high energy tails corresponding to momenta of the order of the total momentum of the incident proton. The energy distributions of Li^8 from Cl^{12} at 20° and 90° are very similar to the corresponding distributions of residual Li^8 nuclei from the disintegration of Be^9 by high energy protons, and it is concluded

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ACCESSION NR: AP4048630

that the ejected Li^8 nucleus is formed by direct reaction of the incident proton with a Be^9 cluster within the C^{12} nucleus. The spectrum of Li^8 from Al^{27} was calculated on the assumption that it is formed from a Be^9 cluster and is subject to absorption by the residual nucleus. Good agreement with experiment was found. The spectrum of Li^8 from V^{51} was calculated on the assumption that Li^8 is formed only during the evaporation stage of the reaction. Fair agreement with experiment was obtained for large expulsion angles, but the observed yield at low angles was considerably greater than the calculated. It is concluded that direct reactions with clusters in the peripheral region make a significant contribution in this case also. Orig.art.has: 3 figures.

ASSOCIATION: none

SUBMITTED: 00

SUB CODE: NP

NR. REF SOV: 003

ENCL: 00

OTHER: 000

2/2

ACCESSION NR: AP4009095

S/0056/63/045/006/1784/1792

AUTHORS: Gorichev, P. A.; Lozhkin, O. V.; Perfilov, N. A.

TITLE: Short range products of nuclear disintegrations induced by 2--9 GeV protons

SOURCE: Zhurnal eksper. i teoret. fiziki, v. 45, no. 6, 1963, 1784-1792

TOPIC TAGS: nuclear disintegrations, emulsion nuclei, heavy emulsion nuclei, short range particles, silver fission, bromine fission, fission cross section, disintegration cross section

ABSTRACT: In an attempt to reconcile the highly contradictory experimental data concerning the dependence of the fission cross section of silver on the incident-proton energy, a thorough analysis is made of the heavy emulsion nuclei disintegrations in which two short range particles are emitted mainly in opposite directions. It

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ACCESSION NR: AP4009095

is shown that disintegrations of this type should be classified not as fission of the silver or bromine nuclei of the emulsion, but as disintegrations in which a short range fragment and a recoil nucleus are formed. The upper limit of the cross section for the fission of Ag and Br nuclei by 2--9 GeV protons is about 1 millibarn. "The authors take the opportunity to thank the administration of the High-energy Laboratory of the Ob'yedinenny'y institut yaderny*kh issledovaniy (Joint Institute of Nuclear Research) for making available the proton synchrotron of the Institute, to the nuclear emulsion scanning group of the High-energy Laboratory, headed by S. I. Lyubomilov and V. I. Baranov, for scanning the emulsions employed. The authors are particularly grateful to S. I. Lyubomilov for help and direct participation in the irradiation of the pellicle stacks. The authors are grateful to Yu. P. Yakovlev of the Radievy*y institut (Radium Institute) for a discussion of some of the problems touched upon here." Orig. art. has: 7 figures and 2 tables.

Cord 2/3²

ACCESSION NR: AP4019202

S/0056/64/046/002/0431/0434

AUTHORS: Bogatin, V. I.; Lozhkin, O. V.; Perfilov, N. A.; Yakovlev, Yu. P.

TITLE: Energy spectra and angular distribution of Li-8 fragments produced in interactions between 660-MeV protons and aluminum nuclei

SOURCE: Zhurnal eksper. i teor. fiz., v. 46, no. 2, 1964, 431-434

TOPIC TAGS: lithium 8, lithium 8 fragment, intranuclear reaction mechanism, fragmentation, surface cluster formation, proton aluminum interaction, lithium fragment energy spectrum

ABSTRACT: This work is part of a study of the relation between quasielastic knockout of fragments and the various mechanisms of intranuclear reactions, in which the formation of each specific isotope will eventually be investigated in detail over a wide range of

Cord

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ACCESSION NR: AP4019202

incident-particle energies and target-nucleus masses. The products of the nuclear reactions between 660-MeV protons and aluminum nuclei were registered in nuclear emulsions at several angles and the emulsion tracks corresponding to the nuclei Li^8 , Li^9 , Be^8 , and B^8 were investigated. The observed similarity between the energy spectra of the resultant Li^8 and those of carbon, and the absence of the B^8 isobar in both cases, suggest that in both reactions the Li^8 production is due to formation of nucleon clusters localized on the surface of the target nucleus. The correspondence observed between the calculated and experimental angular distribution of Li^8 confirms this hypothesis and suggests that detailed information on the reactions accompanied by fragments on very light target nuclei will make it possible to identify and separate reactions on surface clusters. "In conclusion, the authors are grateful to Prof. V. P. Dzhelepov for support of this work and to R. G. Vasil'kov for help with the experiment. Orig. art. has: 3 figures.

Cord.

2/3

ACCESSION NR: AP4037605

S/0056/64/046/005/1897/1898

AUTHORS: Gorichev, P. A.; Lozhkin, O. V.; Perfilov, N. A.

TITLE: Angular correlation between multiply produced fragments

SOURCE: Zh. eksper. i teor. fiz., v. 46, no. 5, 1964, 1897-1898

TOPIC TAGS: nuclear fission, fission product, fission cross section, nuclear emulsion, angular distribution, fission fragment

ABSTRACT: The purpose of the work was to plot the excitation function of the multiple emission of fragments and to analyze in detail the angular correlation between a pair of fragments in one disintegration. The results were obtained by exposing emulsions in the internal beam of the OIYAI proton synchrotron to protons of energy 2, 3, 6, and 9 GeV. The absolute values of the cross sections were determined in terms of the cross sections for star production in the emulsion. The angular correlation was shown to be dependent on whe-

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ACCESSION NR: AP4037605

ther the two produced fragments are fast or slow. In stars having one fast and one slow fragment, all the angles between the fragments had equal probability, in stars with two slow fragments a clear cut angular correlation was observed at 120--140°, and in stars with two fast fragments there was a preference for angles less than 90°. The analysis has shown that to explain the angular correlation in the group with two slow fragments it is necessary to assume that the fragment pairs produce simultaneously in one disintegration. Orig. art. has: 2 figures.

ASSOCIATION: None

SUBMITTED: 21Jun63

DATE ACQ: 09Jun64

ENCL: 02

SUB CODE: NP

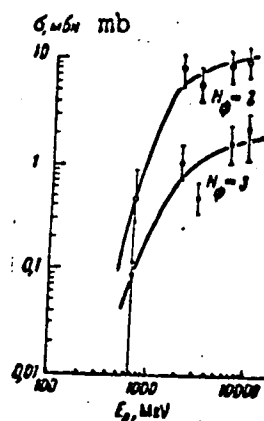
NR REF SOV: 000

OTHER: 000

Cord 2/4

ACCESSION NR: AP4037605

ENCLOSURE: 01

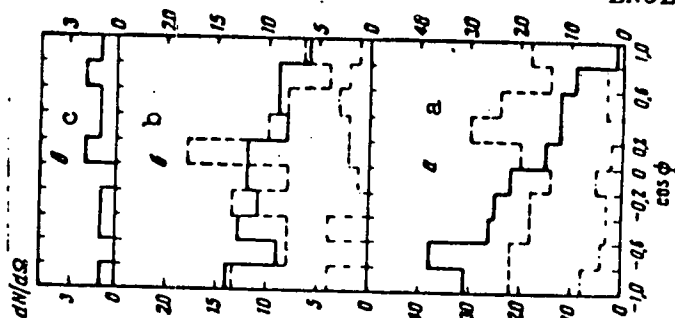


Dependence of the cross section for the production of disintegrations with two and three fragments, on the energy of the incident protons; N_ϕ - number of fragments in one disintegration.

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ACCESSION NR: AP4037605

ENCLOSURE: 02



Distribution of the cosines of the angles between two fragments in one disintegration. Continuous curve - experiment; dashed-curve - calculation for fragments with $Z \geq 4$; dash-dot line - for disintegrations containing at least one Li fragment.
a - group I, $1.5 \leq E_f < 5$; b - group II, $E_{f1} \geq 5$, $1.5 \leq E_{f2} < 5$;
c - group III, $E_f \geq 5$ (energies in MeV/nuc.)

Card 4/4

ACCESSION NR: AP4042591

S/0056/64/046/006/2244/2245

AUTHORS: Perfilov, N. A.; Solov'yeva, Z. I.; Filov, R. A.

TITLE: Alpha particle spectrum of ternary spontaneous fission of Cm-244

SOURCE: Zh. eksper. i teor. fiz., v. 46, no. 6, 1964, 2244-2245

TOPIC TAGS: curium, alpha particle, fission product, energy distribution, alpha spectroscopy

ABSTRACT: The investigation was undertaken in order to check whether the spectral characteristic of the fission alpha particles is indeed independent of the mass number, as was observed by the authors earlier (Atomn. energ. v. 14, 575, 1963; ZhETF v. 44, 1832, 1963). The test was also aimed at checking the correctness of the value obtained for the most probable energy of the fission alpha particles for Cm²⁴². The same experimental setup was used as in the earlier

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ACCESSION NR: AP4042591

investigation, and geometrical corrections were introduced into the experimentally observed energy distribution. The obtained energy spectrum for the ternary fission of Cm^{244} was found to have a maximum near 15.5 ± 0.5 MeV and, assuming a Gaussian distribution, a width 11.5 ± 0.5 MeV at half height. The values obtained for Cm^{242} are $15.5 \pm$ and 12 ± 1 , respectively, indicating that the spectral characteristics agree, within the experimental error, also for two curium isotopes, as they did agree before in the case of U and Pu. However, the shift in the most probable energy of ternary-fission alpha particles cannot be established on the basis of data on three elements only. "The authors thank A. S. Krivokhatskiy for assistance." Orig. art. has: 1 figure.

ASSOCIATION: None

SUBMITTED: 01Apr64

ENCL: 01

SUB CODE: NP

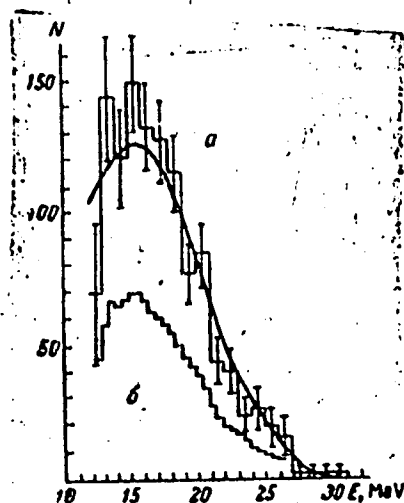
NR REF SOV: 004

OTHER: 003

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ACCESSION NR: AP4042591

ENCLOSURE: 01



Alpha particle energy spectrum of ternary
fission of Cm^{240}
a - experimental, b - following data reduction

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L 13949-65 EWT(m)/T/EWA(m)-2 ASD(p)-3/AFWL/ESD(t)/SSD

ACCESSION NR: AP4047882

S/0056/64/047/004/1178/1184

AUTHORS: Gayevski, V.; Gorichev, P. A.; Perfilov, N. A.

TITLE: Formation of Li-8 fragments in the interaction between 9-GeV protons and lead nuclei

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 47, no. 4, 1964, 1178-1184

TOPIC TAGS: lead, lithium, fission fragment, proton nucleus interaction, nuclear emulsion

ABSTRACT: The sandwich method (emulsion stock with interleaved metal foils) is used to investigate the production probability, energy spectrum, and angular distribution of Li⁸ fragments produced in the disintegration of lead nuclei by 9-GeV protons. The need for this investigation was brought about by some contradictions in the results of the emulsion method, which does not permit observation

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ACCESSION NR: AP4047882

of the disintegration of a single type of nucleus. The emulsion stock was irradiated in the internal beam of the OIYaI synchrotron, which was parallel to the plane of the emulsion. The NIKFI-K emulsion dimensions were $10 \times 10 \times 0.04$ cm, with the foil thickness being 18 microns. The proton flux in the emulsion was $8 \times 10^6 \text{ cm}^{-2}$. The stars containing the Li^8 fragments were detected by area scanning from the side of the emulsion in contact with the foil. The geometrical corrections of the test results are briefly explained. Comparison of the experimental data with the predictions of the evaporation theory show that best agreement is obtained with a temperature $T = 14.9$ MeV and a Coulomb barrier height 9.6 MeV. It is concluded that an attempt to explain the energy and angular distributions of the Li^8 fragments with the aid of the evaporation theory leads to one of two conclusions: 1) the evaporation theory is correct but must be refined (primarily with respect to the dependence of the nuclear temperature and the magnitude of the Coulomb barrier on the excitation energy); 2) evaporation theory cannot be used to describe

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ACCESSION NR: AP4047882

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the formation of most Li^8 fragments. "The authors thank the directors of the high energy laboratory of OIYAI for affording the opportunity to irradiate the emulsion chambers in the synchrotron, and to the emulsion processing group of the high energy laboratory led by S. I. Lyubomilov and V. I. Baranov for processing the emulsions. The author is particularly grateful to S. I. Lyubomilov for help and direct participation in the emulsion chamber irradiation. Valuable discussions were held with our co-workers at the Radium Institute O. V. Lozhkin and I. I. P'yanov," Orig. art. has: 5 figures and 1 table.

ASSOCIATION: None

SUBMITTED: 26Mar64

ENCL: 00

SUB CODE: NP

NR REF SOV: 002

OTHER: 010

Card 3/3

L 17540-63

EWF(q)/EWT(11)/BDS

AFFTC/ASD

JD/JG

ACCESSION NR: AP3004420

S/0020/63/151/004/0826/CS28

AUTHORS: Lozhkin, O. V., Perfilov, N. A., Yakovlev, Yu. P. 64
58

TITLE: Singularities of the formation of Li sub 3 sup 8 during the reaction of 660 Mev protons with C sub 6 sup 12 nuclei. 27

SOURCE: AN SSSR. Doklady*, v. 151, no. 4, 1963, 826-828

TOPIC TAGS: Li sub 3 sup 8 , Li , C , C sub 6 sup 12 , phasotron, polystyrene, polyethylene, B sub 5 sup 8

ABSTRACT: Authors studied the angular distribution of the fragments of Li_3^8 and their energy spectra upon splitting of C_6^{12} nuclei. Thin films of polystyrene and polyethylene were irradiated in a vacuum chamber by a beam 10^{13} protons per cm^2 from the phasotron of the consolidated institute for nuclear studies. The proton energy was 660 Mev. The fragments were recorded photographically at angles of 20, 47, 90, and 137° relative to the proton beam. Practically all of the observed tracks belonged to Li_3^8 nuclei. Absence of the B_5^8 isobar is significant, because it indicates an asymmetry of the nuclear structure of C_6^{12} in relation to the mirror clusters of B_5^8 and Li_3^8 . Conclusions are drawn concerning the origin

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ACCESSION NR: AP3004420

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of the soft part of the spectra, and other features of the observed distributions.
"In conclusion, the authors express their deep gratitude to Prof. V. P. Dzhelepov
for the support of this work, to R. G. Vasil'yev, V. N. Kuz'min, Ye. S. Rozhkov,
and R. M. Yakovlev for the help with the experiments, and to P. A. Gorichev for
the discussion of several problems touched upon in this paper". Orig. art. has:
2 figures.

ASSOCIATION: none

SUBMITTED: 01Mar63

SUB CODE: PH

DATE ACQ: 21Aug63

NO REF SOV: 005

ENCL: 00

OTHER: 001

Card 2/2

AVDEYCHIKOV, V.V.; BOGATIN, V.I.; LOCHKIN, O.V.; PREDILOV, A.I.;
YAKOVLEV, Yu.I.

Multinucleon associations in the peripheral region of nuclei
in reactions involving fast particles. Izv. AN SSSR. Ser.
fiz. 28 no.10:1573-1577 O '64. (MOR- 17-12)

GAYEVSKI, V.; GORICHEV, P.A.; PERFILOV, N.A.

Genesis of Li^8 fragments in the interaction between 9 Gev. protons
and lead nuclei. Zhur. eksp. i teor. fiz. 47 no.4:1178-1184 0 '64.
(MIRA 18:1)

ZAKHAROV, V.I.; NOVIKOVA, N.R.; PERFILOV, N.A.; FADINA, Ye.V.

Pyrogallolamidol developer for nuclear emulsions. Zhur.nauch.
i prikl.fot. i kin. 9 no.6:422-425 N-D '64.

(MIRA 18:1)

KOCHEROV, N.P.; PERFILOV, N.A.

Measuring photolytic silver amounts in emulsions by means of
activation analysis. Zhur. nauch. i prikl. fot. i kin. 9 no.5:
360-363 S-O '64. (MIRA 17:10)

PERFILOV, N.A.; SOLOV'YEVA, Z.I.; FILOV, R.A.

Spectrum and particles in the triple spontaneous fission of
cm244. Zhur. eksp. i teor. fiz. 46 no.6:2244-2245 Ja '64.
(MIRA 17:10)

PERFILOV, P.A.

Results of injecting novocaine into the sciatic nerve. Vrach. delo.
no.2:191-192 P '56. (MLRA 9:7)

1. Klinika nervnykh bolezney (zaveduyushchiy zasluzhennyy deyatel'
nauki, professor D.I.Panchenko) Kiyevskogo instituta usovershen-
stvovaniya vrachey
(SCIATIC NERVE) (NOVOCAINE)

USSR/Human and Animal Morphology (Normal and Pathological) Nervous System. 3

Abs Jour : Ref Zhur - Biol., No 7, 1953. N 31256

Author : ~~Perfilov P.A.~~

Inst : Not Given

Title : Pathomorphological Changes in the Nerve and its Segmented Apparatus During Intraneural Introduction of a Solution of Novocaine.

Orig Pub : Vrachebn. delo, 1957, No 7, 699-702

Abstract : In the upper third of the trunk of the left sciatic nerve of 10 rabbits and 10 dogs, up to 1 ml of a 0.5% solution of novocaine was introduced. As a result, changes appeared in all components of the nerve trunk. Changes in the axis cylinder were reversible. The myelin sheath of the nerve fibers satisfactorily showed gross changes which have the characteristics of degeneration of periaxons, but which could be reversed during determined conditions. The most stable changes appeared in the peri- and epineural areas. They were

Card : 1/1 predominantly proliferative and could lead to impairment of conduction.

PERFILOV, P.A., dotsent (Kiyev)

Pathomorphological changes in an injured nerve depending
on the degree of the injury. Vrach. delo no.2:67-72 F '62.

(MIRA 15:3)

1. Kafedra nervnykh bolezney (zav. - zasluzhennyy deyatel'
nauki, prof. D.I. Panchenko) Kiyevskogo instituta usovershen-
stvovaniya vrachey.

(NERVES--WOUNDS AND INJURIES)

PERFILOV, P. A., dots.

Pathogenesis of trophic ulcers in partial injury of the nerve
and methods for their prevention. Nov. khir. arkh. no.3:70-72
'62. (MIRA 15:4)

1. Kafedra nervnykh bolezney (zav. - zasl. deyatel' nauki, prof.
D. I. Panchenko) Kiyevskogo instituta usovershenstvovaniya vrachey.

(NERVES, PERIPHERAL--WOUNDS AND INJURIES)
(ULCERS)

PERFILOV, P.A., dotsent

Nerve regeneration in experimental animals under biotron conditions.
Vrach.delo no.10:107-111 O '62. (MIRA 15:10)

1. Kafedra nervnykh bolezney (zav. - zasluzhennyy deyatel' nauki,
prof. D.I.Panchenko) Kiyevskogo institua usovershenstvovaniya
vrachey.

(CLIMATOLOGY, MEDICAL)
(NERVOUS SYSTEM—DEGENERATION AND REGENERATION)

PANCHENKO, Dmitriy Ivanovich, zasl. deyatel' nauki prof.;
PERFILOV, Petr Afanas'yevich, doktor med. nauk;
PRONIV, Daniil Ivanovich, doktor med. nauk;
CHESLOVSKIY, K.S., red.

[General and local phenomena in the process of the restoration of nerve trunks; studies in the biotron] Obshchie i mestnye yavleniya v protsesse vosstanovleniya nervnykh stvolov; issledovaniya v biotrone. Kiev, Zdrov'ia, 1964. 123 p. (MIRA 18:1)

PERFILOV, P.A., dotsent

Regeneration in hemorrhage in a partially injured nerve. Vrach.
delo no.1:83-87 Ja '63. (MIRA 16:2)

1. Kafedra nervnykh bolezney (zav. - zasluzhennyy deyatel' nauki,
prof. D.I. Panchenko) Kiyevskogo instituta usovershenstvovaniya
vrachey.

(NERVES—DEGENERATION AND REGENERATION)
(HEMORRHAGE)

NOSOV, M.S.; ORANSKIY, N.N.; PERFILOV, V.A.; KRASNOV, V.S., red.;
KROLEV, A.F., nauchnyy red.; PROFERANSOVA, N.V., red.;
TOKER, A.M., tekhn. red.

[Mechanization of work on livestock farms] Mekhanizatsiya
rabot na zhivotnovodcheskikh fermakh. Moskva, Proftekhizdat
1963. 399 p. (MIRA 16:10)

1. Chlen-korrespondent Vsesoyuznoy akademii sel'skokhozyay-
stvennykh nauk im. V.I. Lenina (for Krasnov).
(Stock and stockbreeding--Equipment and supplies)
(Farm mechanization)

PERCHIKHIN, Abram Vladimirovich; PERFILOV, Vladimir Andreyevich;
PESTRYAKOV, A.I., red.

[Machine sheepshearing. Mashinnaya strizhka ovets. Moskva, Sel'khozizdat, 1963. 206 p. (MIRA 17:11)]